Mountain View Environmental Sustainability Task Force, Built Environment Working Group

Recommendations

Recommendation	Short -term	Medium -term	Long -term
** Public Buildings to Achieve LEED Silver.	✔		✔
1. Mandate Green Building Standards	✔		✔
2. Revolving loan & carbon offset program to fund efficiency upgrades for buildings.		✔	
3. Commercial Building Energy Audit	✔	✔	✔
4. Require all businesses to meet a Green Business Certification		✔	
5. Develop Energy Consumption Standards for all Buildings		✔	✔
6. Provide residential building annual energy usage at time of transfer.	✔		
7. Encourage Green Practices within the Planning & Building Departments	✔		
8. Green Building Incentive Program	✔		
9. All construction projects, both new and renovation, to divert 75% of construction and demolition waste from landfill.	✔		

INTRODUCTION

Mountain View Environmental Sustainability Task Force
Built Environment Working Group

"The UN Climate Convention's ultimate objective is to "prevent dangerous climate change." To achieve this objective, the most recent Intergovernmental Panel on Climate Change report concludes **emission growth must be reversed within a decade** and reductions of 50 to 85 percent by 2050 will be necessary.

The technologies and practices to achieve these targets exist today. Former World Bank Chief Economist Nicholas Stern's comprehensive review of climate change economics concludes **we can achieve atmospheric stability if we start investing annually one per cent of global domestic product on emission reductions.** Failure to do so will result in a **five to twenty per cent annual loss in GDP through climate change impacts.** Hundreds of local governments across the country are beginning to take action on their own or through growing efforts by local government associations" the US Green Building Council.

"The current building stock—more than 300 billion square feet—is the single largest contributor to global warming in the country. Buildings generate 48 percent of greenhouse gas emissions in the United States, creating one of the greatest opportunities to take immediate action on climate change. In the United States alone, buildings account for:

- 70% of electricity consumption,
- 39% of energy use,
- 39% of all carbon dioxide (CO2) emissions,
- 40% of raw materials use,
- 30% of waste output (136 million tons annually), and
- 12% of potable water consumption" USGBC

According to the ICLEI study, the City of Mountain View Emissions by sector are: Residential 100,431, Commercial 160,273 and Industrial 46,234 totaling 306,938 CO2e metric tons per year. The total CO2e emissions from Mountain View as a whole is 846,146 metric tons. The energy usage of the buildings alone in Mountain View comprises 36% of the entire CO2e output. This does not take into account the CO2 generated in the transportation used for construction or maintenance of those buildings or the CO2 generated for the solid waste from the construction or demolition of those buildings.

Since typical building construction uses so many resources and touch on just about every environmental category measurable, it is prudent to look to building design, construction, maintenance and operations to quickly slow down and ultimately stop climate change and the destruction of our local environment. To this end, the Santa Clara County Cities Association (SCCCA) developed several actions for the member cities to take up. The Mountain View City Council voted for two of the recommendations, 1) Recognize and adopt the United States Green Building Council's (USGBC) Leadership in Energy and Environmental Design or LEED rating system and Build It Green's BIG GreenPoint Rated system as the official building standards for the City of Mountain View and 2) Require all development application submittals to include a completed LEED or GreenPoint Rated checklist. The third action from the SCCCA 3) Adopt a policy of LEED Silver certification or better for all new public construction and renovation projects over 5,000 square feet, was referred to the Task Force Built Environment Working Group for their recommendations. This action is covered in the recommendation below.

Recommendation #**

Title: PUBLIC BUILDINGS TO ACHIEVE LEED SILVER.

Working Group: Built Environment

Statement of Issue

As noted above, buildings in Mountain View are responsible for 36% of the entire CO2e output when calculating just their energy use. Their water usage, material usage, solid waste generation from construction, heat increase to the immediate area and sick building syndrome are all serious issues in addition to their heavy energy use and CO2e generation.

The USGBC Leadership in Energy and Environmental Design, or LEED, rating system is a proven resource throughout the Nation and the world. LEED touches on all the problem subjects noted above and has been shown through studies to reduce the buildings' impacts in each category in a substantial way. It's as much an educational tool as it is a system for quantifying the reductions in environmental impacts of buildings. Through LEED the USGBC has brought about a very quick market transformation that no other system had been able to accomplish. The difference is in the holistic approach of including everyone involved in the business of making buildings. Not only did they include the designers and builders of buildings, but also the product manufacturers, material suppliers and the owners. By including everyone they were finally able to create the synergies required to transform the entire market place.

Mountain View can benefit from the quick work of several of the other Bay Area communities who have been building LEED certified buildings for years. Just being LEED Certified is not enough any more. Many communities within Santa Clara County have already passed regulations calling for LEED Silver certification for their public buildings and some have called for LEED Gold. The construction industry in the Bay Area is quite used to designing and building LEED certified building projects.

Recommendation

All public buildings greater than 5,000 square feet to achieve LEED Silver Certification in the short term and to achieve LEED Gold phased over 5 years for the longer term.

Environmental Impact

LEED certified commercial and institutional buildings are designed to use an average of 32% less electricity, 26% less natural gas and 36% less total energy than standard buildings. (USGBC)

Fiscal Impact and Synergies

Studies from Davis Langdon have shown buildings up to a LEED Silver rating cost virtually the same as market rate buildings. This is due in large part to the positive market change largely as a result of the USGBC and LEED programs. And the more Green Buildings we build the more the prices for

Green products and buildings will reduce even more. LEED Silver rated buildings show a 36% savings in energy bills.

Obstacles

- There is a learning curve for designers and builders who have not yet done LEED projects or "green" buildings, but that is lessening quickly as more and more of them learn the marketing benefits of knowing how to design and build green buildings. This is definitely where the construction market is going, as local construction professionals will attest. These professionals can turn what may seem like a deficit into an opportunity by educating themselves in green building and marketing themselves in this incredibly fast growing market.
- Another obstacle in achieving LEED certified buildings is the notion by many people, construction professionals and clients as well, that green buildings cost more money than non-green or traditional buildings. Studies have shown that this is not true, as noted by the Davis Langdon study, but the notion prevails due to a lack of education on the subject. As noted in the study "We continue to see project teams conceiving of sustainable design as a separate feature. This leads to the notion that green design is something that gets added to a project – therefore they must add cost. This tendency is especially true for less experienced teams that are confronting higher levels of LEED certification (Gold and Platinum). Until design teams understand that green design is not additive, it will be difficult to overcome the notion that green costs more, especially in an era of rapid cost escalation. " Those of us in the industry like to explain it to our clients this way: instead of calling them green buildings we call them high performance buildings. Clients are getting a better, high performance building for the same amount of money as a market grade building.

Partnerships

There are many local affiliates of national construction professional association who have green building education programs. For instance the Northern California Chapter and Silicon Valley Branch of the US Green Building Council (USGBC), the Committee on the Environment (COTE) for the American Institute of Architects (AIA), Santa Clara Valley Chapter, and the International Interior Designer Association (IIDA) are just a few of the local associations who hold regular lunch-and-learns, seminars and workshops to educate local construction professionals in green building techniques.

Appendix

Citations (not referenced in footnotes)

1. Cost of Green Revisited: Reexamining the Feasibility and Cost Impact of Sustainable Design in the Light of Increased Market Adoption July 2007 by Davis Langdon

Web Sites (not referenced in footnotes)

1. http://www.usgbc.org

Contact Information

Recommendation #1

Title: GREEN BUILDING STANDARDS.

Working Group: Enter the name here.

Statement of Issue

"Buildings generate 48 percent of greenhouse gas emissions in the United States, creating one of the greatest opportunities to take immediate action on climate change." the US Green Building Council. As noted above, buildings in Mountain View are responsible for 36% of the entire CO2e output when calculating just their energy use. Their water usage, material usage, solid waste generation from construction, heat increase to the immediate area and sick building syndrome are all serious issues in addition to their heavy energy use and CO2e generation.

The USGBC Leadership in Energy and Environmental Design or LEED rating system is a proven resource throughout the Nation and the world. The Mountain View City Council has already moved to enact an ordinance calling for LEED to be the green building rating standard for the city.

Recommendation

All private buildings greater than 5,000 square feet to fill out the LEED checklist (already required by City Ordinance), include it on the cover sheet of submitted drawings and show verification of the checklist by a LEED Accredited Professional and the building energy calculations must show it is 15% under Title-24 Energy Standards in the short term and to achieve LEED Certification phased in over **3** years for the medium term.

All new residential construction, as well as additions and renovations with a project value of >$75,000, to require a verified GreenPoint checklist as a part of the submittal drawings. A minimum score of 70 points shall be achieved in order to qualify for a building permit. Standards should be established in line with what Palo Alto has adopted which are among the most aggressive verification required standards established to date in the Bay Area (see table below for program details).

Project Type	Requirement	Minimum Threshold
Multi Family Residential		
New Construction	Multifamily GreenPoint Checklist	70 points - *Verified*
Additions/Renovations ***Value>$100,000***	Multifamily GreenPoint Checklist	Submit Checklist on Plans
Single Family Residential		
New Construction >2,550 sf	Single Family GreenPoint Checklist	70 points + 1 point per additional 70 sf (150 point max)- *Verified*
New Construction of >1,250 sf and <2,550 sf	Single Family GreenPoint Checklist	70 points - *Verified*
Additions <1,250 sf and/or renovations with permit value of > $350,000	Single Family GreenPoint Checklist	70 points - *Verified*
Additions <1,250 sf and/or renovations >$75,000 and <$350,000 permit value	Home Remodeling GreenPoint Checklist	*Submit filled in checklist on plans -Self Verified*
Renovations of <$75,000	No Requirement	No Requirement

The City should provide an expert to aid it getting individuals developing projects within the city up to speed on the rating system requirements, appropriate timing of steps and methodologies to successfully meet the new requirements. While, for the most part any private developer of buildings can hire firms with the correct expertise to design and build a LEED or GreenPoint Certified buildings, those individuals who are inexperienced in green project development may need some high level consulting, provided by the City, to make sure they kick off their project correctly to meet some of the early phase rating system requirements. Some rating system prerequisites must be planned from initial phases of the project correctly or the project may not be able to earn certification. Until a larger percentage of owners, designers and contractors have built buildings within thees rating systems the City should provide this expertise to make sure these constituents are successful. In the short term the Council can hire a firm that has this expertise to help building owners take the necessary steps at the correct time to make sure they can achieve the LEED or GreenPoints certification requirements. For the long term the City should hire individuals within the appropriate departments with this expertise and train their existing staff in these rating systems.

Environmental Impact

LEED certified commercial and institutional buildings are designed to use an average of 32% less electricity, 26% less natural gas and 36% less total energy than standard buildings. (USGBC), Commercial 160,273, Industrial 46,234
74,343

Metrics for GreenPoint Rated homes are not readily available, however since the Energy Star designation requires the same minimum requirements (15% above Title 24 requirements), metrics for this program can be used. Buildings that have earned the Energy Star label use an average of almost 40 percent less energy than average buildings, and emit 35 percent less carbon. The ICLEI study of Mountain View states 100,431 metric tons CO2e is created by residential buildings building

GreenPoint Rated residential projects would reduce the carbon generated by 35% x 100,431 equaling 35,150 metric tons CO2e.

Fiscal Impact and Synergies

Studies from Davis Langdon & Associates have shown buildings up to a LEED Silver rating cost virtually the same as market rate buildings. This is due in large part to the positive market change largely as a result of the USGBC and LEED programs. And the more Green Buildings we build the more the prices for Green products and buildings will reduce. LEED Certified rated buildings show a 36% savings in energy bills which will continue to increase with the rising price of fuels to create that energy.

"According to the CoStar study, LEED buildings command rent premiums of $11.33 per square foot over their non-LEED peers and have 4.1 percent higher occupancy. Rental rates in Energy Star buildings represent a $2.40 per square foot premium over comparable non-Energy Star buildings and have 3.6 percent higher occupancy.

And, in a trend that could signal greater attention from institutional investors, Energy Star buildings are selling for an average of $61 per square foot more than their peers, while LEED buildings command a remarkable $171 more per square foot." **www.costart.com** . The Appraisal Journal Cites $20.73 increase in resale value for every $1 in annual energy cost savings in a recent study. (see appendix for article)

Obstacles

- There is a learning curve for designers and builders who have not yet done LEED projects or "green" buildings, but that is lessening quickly as more and more of them learn the marketing benefits of knowing how to design and build green buildings. This is definitely where the construction market is going, as local construction professionals will attest. These professionals can turn what may seem like a deficit into an opportunity by educating themselves in green building and marketing themselves in this incredibly fast growing market.
- Another obstacle in achieving LEED certified buildings is the notion by many people, construction professionals and clients as well, that green buildings cost more money than non-green or traditional buildings. Studies have shown that this is not true, as noted by the Davis Langdon study, but the notion prevails due to a lack of education on the subject. As noted in the study "We continue to see project teams conceiving of sustainable design as a separate feature. This leads to the notion that green design is something that gets added to a project – therefore they must add cost. This tendency is especially true for less experienced teams that are confronting higher levels of LEED certification (Gold and Platinum). Until design teams understand that green design is not additive, it will be difficult to overcome the notion that green costs more, especially in an era of rapid cost escalation. " Those of us in the industry like to explain it to our clients this way: instead of calling them green buildings we call them high performance buildings. Clients are getting a better, high performance building for the same amount of money as a market grade building.
- There is a learning curve also for the building and planning departments. These techniques and requirements are new and different to what is in staff's comfort zone. There will need to be a willingness to try things they have not done before. Many new 'green' systems are not being

approved currently even though they are not technically against the current codes. There has to be an openness to allowing techniques and systems that are new and foreign to the plan checkers and review staff. Promoting group meetings where all the parties from various departments meet with designers and builders to review new green systems together to gain a better understanding and aid in approvals is necessary.

Partnerships

There are many local affiliates of national construction professional association who have green building education programs. For instance the Northern California Chapter and Silicon Valley Branch of the US Green Building Council (USGBC), the Committee on the Environment (COTE) for the American Institute of Architects (AIA), Santa Clara Valley Chapter, and the International Interior Designer Association (IIDA) are just a few of the local associations who hold regular lunch-and-learns, seminars and workshops to educate local construction professionals in green building techniques.

Appendix

Citations (not referenced in footnotes)

Web Sites (not referenced in footnotes)

1. http://www.ecosmartinc.com/presentations/1-Eco-$mart-HO-FreeGuide.pdf

2. http://www.usgbc.org

Contact Information

RESIDENTIAL GREEN BUILDING ORDINANCES

Location	Jurisdiction	Requirements	Incentives	Type of Standard
Cities Within SCC	Los Altos	All new construction and >50% remodels must achieve GreenPt rating of 50	Expedited review for project >75 GreenPts.	MANDATORY - Build it Green
	Los Altos Hills	All new construction must be 15% more efficient than Title 24 standards through increased efficiency or solar		MANDATORY - Title 24
	Palo Alto	All new construction greater than 1250 sf must achieve GreenPt rating of 70		MANDATORY - Build it Green
	Los Gatos	Voluntary Hillside Building Standards		VOLUNTARY
	Saratoga	Green Point checklist required		VOLUNTARY - Build it Green/ Cities Assoc.
	Santa Clara	Green Point checklist required		VOLUNTARY - Build it Green/ Cities Assoc.
	Campbell	Green Point checklist required		VOLUNTARY - Build it Green / Cities Assoc.
	Milpitas	Green Point checklist required		VOLUNTARY - Build it Green/ Cities Assoc.
	San Mateo County	All new construction and >50% remodel must achieve 50 GreenPt or LEED cert	Expedited review for project >75 GreenPts.	MANDATORY - Build it Green or LEED
	San Francisco County	Voluntary until 2009, then 25 GreenPts in 2009, 50 in 2010 and 75 in 2012		VOLUNTARY / MANDATORY - Build it Green
	Marin County	New construction/remodels larger than 3,500 sf and additions >500 sf resulting in floor area of >3500 sf must achieve Title 24 efficiency of a 3,500 sf residence		MANDATORY - Title 24
	Santa Cruz County	Requires minimum soore to receive building permit (10 pts for first 350 sf, 1.5 pts for ea additnal 100 sf	Expedited review for higher points; Green Building Award	MANDATORY - Alameda County/StopWaste
	Contra Costa County	Green Point checklist (voluntary)		VOLUNTARY - Build it Green
	Sonoma County	Voluntary		
Other cities/counties	Mill Valley	New construction/remodels larger than 3,500 sf and remodels >500 sf must achieve Title 24 efficiency of a 3,500 sf residence		MANDATORY - Title 24
	Santa Rosa	All new construction must be 15% more efficient than Title 24 standards		MANDATORY - Title 24
	Rohnert Park	New construction > 1,600sf and additions > 1,000 sf must be 10% more efficient than Title 24; larger than 2,000 sf must be 15% more efficient than Title 24		MANDATORY - Title 24
	Albany	All new construction and renovation subject to Design Review must achieve GreenPt rating of 50		MANDATORY - Green Point
	Petaluma	Green Point checklist (voluntary)	Green Point rated structures receive $500 rebate	VOLUNTARY - Green Point
	King County, WA	Voluntary		VOLUNTARY - "Built Green"

Title: REVOLVING LOAN AND LOCAL CARBON OFFSET PROGRAM

Working Group: Built Environment

Statement of Issue: Most energy efficiency upgrades pay for themselves over time, with savings on energy bills. Yet up-front costs can deter investments. Reluctance to invest in energy efficiency is particularly a problem for rental properties, where owners make investments but often don't reap the benefits of reduced energy bills. Renter-occupied housing units total 18,285, or 58% of Mountain View's residents.[1] Owners of rental housing usually do not pay for utilities, and therefore do not have financial incentives to invest in energy efficiency upgrades to properties. Similarly, most utility bills for commercial properties are not paid by the owner, making energy efficiency upgrades a low priority.

Recommendation: The City of Mountain View would establish a revolving loan program to fund energy efficiency upgrades of commercial and residential properties, with highest priority on lending to projects improving rental and low-income properties.

At the same time, the City would establish a local carbon offset program, whereby gross consumers of energy could offset carbon emissions. Offsets would pay for the loan program oversight. If carbon offset revenues are high enough, a grant program could also be established for energy efficiency improvements of low income rental housing.

The availability of loans, (and grants, if carbon offset income is high enough), would be publicized on the city's website, on annual property tax bills, and through other environmental sustainability outreach programs.

Timeline: Medium Term (1-3 years)

Environmental Impact: High potential for greenhouse gas reductions at properties where investments are made.

As one example, up-front funding through the loan program could bring more efficient refrigerators into Mountain View homes. An Energy Star-qualified refrigerator model uses at least 20% less energy than required by current federal standards.[2] According to the U.S. Department of Energy, the price premium for an Energy Star refrigerator is $30 to $100, with an investment recovery period of two to six years.[3] Yet most new refrigerator purchases are not Energy Star; currently only 38% of California households have an Energy Star refrigerator.[4] If 20% of Mountain View's homes bought an Energy Star refrigerator instead of a lower-efficiency new model, savings could amount to 200

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[1] City of Mountain View, http://www.ci.mtnview.ca.us/services/learn_about_our_city/demographics.asp

[2] http://www.energystar.gov/index.cfm?c=refrig.pr_refrigerators

[3] U.S. Department of Energy, "Refrigerators 2007 Partners Resource Guide." http://www.energystar.gov/ia/partners/manuf_res/downloads/2007Refrigerator_prg.pdf

[4] U.S. Department of Energy, "Refrigerators 2007 Partners Resource Guide." http://www.energystar.gov/ia/partners/manuf_res/downloads/2007Refrigerator_prg.pdf

metric tons CO2e per year. If an additional 10% of old (pre-1993) refrigerators were upgraded to Energy Star models, savings could total over 550 metric tons CO2e (see chart).

ANNUAL SAVINGS: Energy Star Refrigerators

Scenario	% of homes making change	Annual CO2e Savings (tons
Replace pre-1993 model w comparable new Energy St model	0.10	354
Purchase Energy Star mod instead of comparable nev model	0.20	205
	Total	*558*

Fiscal Impact and Synergies: Staffing would be needed to design and oversee program. The program could be self-funded through carbon offsets. Mountain View's 2005 greenhouse gas inventory estimates that the community-wide GHG emissions total approximately 846,146 metric tons CO_2e. If even 1% of these emissions were offset through a local carbon offset program, at $10 per ton, the program would generate nearly $85,000 per year.

Obstacles & Partnerships: A partnership with a financial institution would be ideal. A partnership with a non-profit environmental group or with relevant corporate entities working in the energy efficiency arena could also be beneficial. For instance, GreenNow USA, a Mountain View-based startup company, is already developing a pay-as-you save financing program for residential energy efficiency upgrades.

Title: ALL EXISTING BUILDINGS TO PERFORM A PG&E OR EQUAL ENERGY AUDIT.

Working Group: Enter the name here.

Statement of Issue

"Buildings generate 48 percent of greenhouse gas emissions in the United States, creating one of the greatest opportunities to take immediate action on climate change." the US Green Building Council. More of that comes from existing buildings than new due to the increasing efficiency of new equipment and technologies used in new buildings.

Recommendation

All existing buildings to perform a PG&E or equal energy audit phased over 5 years. The building or business owners must show the audit in order to renew their Mountain View business license, but they have 5 years to achieve the goal. Incentives should be identified, outside of the financial savings for energy upgrades, to get building and business owners to obtain the audits within the first 3 years in order to relieve the stress on PG&E's system.

Environmental Impact

Building modifications are not required as a part of the recommendation, but it is hoped that by identifying the problem areas and potential savings of many 'low hanging fruit' items that it will be shown to be in the business owner or building owner's best interest financially to perform many of these items. The environmental impact will be to reduce energy usage and as a result GHG's, but it is very difficult to calculate how much.

Fiscal Impact and Synergies

Although savings will vary widely among the differing building/operational types and the amount of upgrades performed based on the audit results, but in a 2 minute online energy survey on the PG&E website, $8,000 in estimated annual energy savings were identified for a 10,000 square foot office building in Mountain View.

Obstacles

Partnerships

PG&E

Appendix

Citations (not referenced in footnotes)

Web Sites (not referenced in footnotes)

1. www.pge.com

Contact Information

Recommendation #4

Title: REQUIRE GREEN BUSINESS CERTIFICATION

Working Group: Built Environment

Statement of Issue: Simple changes can save businesses substantially on their utility bills, and often pay for themselves in a short time. In addition, they can contribute significantly to sustainability, including large reductions in waste and in water and other resource use. Yet most businesses are not aware of these potential savings.

Santa Clara County's Integrated Waste Management Division currently administers a Green Business Program. They assist, recognize and promote businesses and government agencies that volunteer to operate in a more environmentally responsible way.

> "To be certified "green," participants must be in compliance with all regulations and meet program standards for conserving resources, preventing pollution and minimizing waste. We offer motivated businesses and agencies an easy-to-use framework for improving environmental performance. Over 725 businesses and public agencies have been certified since 1996 bay area wide and over 115 of those are in Santa Clara County."[5]

Currently, they have checklists for the following industry sectors:

1. Auto Body
2. Auto Repair
3. Dental Offices
4. Garment Cleaners (using CO2 or Wet cleaning only)
5. Home Office
6. Hotel
7. Landscaper
8. Office/Retail
9. Painter
10. Printer
11. Remodeler
12. Restaurant
13. School

In addition, Pacific Gas & Electric offers free energy audits to commercial businesses.

Recommendation: Require all businesses to obtain certification as a green business. Mountain View could establish its own green business certification program, or partner with existing organizations.

For instance, small businesses could apply for the Santa Clara County Green Business program. Larger, more complex businesses would most likely be more appropriate for other awards/recognition

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5 http://www.reducewaste.org/portal/site/iwm/agencychp?path=%2Fv7%2FIntegrated%20Waste%20Management%20%28DIV%29%2FGreen%20Business

programs including Sustainable Silicon Valley, ISO 14001, EPA's Performance Track and the California Integrated Waste Management Boards' Waste Reduction Awards Program (WRAP).[6]

Mountain View's green business requirement would be tied to the existing business license fees. Fees would double for any business not achieving certification. Collected fees would be used to fund Mountain View staff to assist with outreach and certification, and/or additional staff for partnership organizations. (The Santa Clara County Green Business program, which currently has only 1.3 fulltime staff, so they are not set up to handle a large influx of applications.)

One option would be to get business sectors together for a meeting and go over the checklist together. Staff would be needed verify the checklist at a walk-through visit, and the businesses would still have to be run through compliance agencies, but having industry sectors hear the information together may streamline the process and reduce staffing needs.

Timeline: Medium Term (1-3 years)

Environmental Impact:

Many of the green business requirements result in reduced carbon emissions and in energy bill savings. For example, simple changes to commercial lighting systems such as more efficient lamps, occupancy sensors, timers and daylighting can have dramatic savings. Just the use of time scheduling and daylighting can save a business with an open office layout 2000 kilowatt hours per year.[7] If 10% of Mountain Views businesses were to implement this, annual CO2e savings would be approximately 240 metric tons, with total annual energy bill savings to these businesses of over $138,000.[8]

Fiscal Impact and Synergies:

The program would be self-sustaining. Businesses complying with the green certification program would save on energy costs, and pay the current business license fees ($30 to $100 per year for most businesses). Businesses choosing not to comply would pay doubled fees. Assuming an average annual business license fee of $50 per year, and 5,000 businesses, with 10% of businesses choosing green certification to start, revenues could be over $200,000 in the first year. As more businesses comply, revenue would diminish, but so would the workload and the success of the program.

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[6] "Performance Track recognizes and drives environmental excellence by encouraging facilities with strong environmental records to go above and beyond their legal requirements. Members set typically four public, measurable goals to improve the quality of our nation's air, water, and land. Members include major corporations, small businesses, and public facilities that are steering a course toward environmental excellence." http://www.epa.gov/perftrac/index.htm

[7] http://www1.eere.energy.gov/femp/pdfs/light_controls.pdf

[8] Calculations based on data from US DOE, Energy Efficiency and Renewable Energy, Federal Energy Management Program, "How to Select Lighting Controls for Offices and Public Buildings" http://www1.eere.energy.gov/femp/pdfs/light_controls.pdf

REVENUE FROM GREEN BUSINESS PROGRAM

Scenario	% of busines paying increased fe	# of businesse paying increased fees	Total additional t revenue ($)
Scenario year 1 10% green certified	0.90	4500	**$225,000**
Scenario year 3 25% green certified	0.75	3750	**$187,500**

Obstacles:
An enforcement provision may need to be added to the business license requirement, so that businesses can't just choose to not renew their licenses.

Partnerships:
Although Mountain View could establish its own green business certification process, partnerships with organizations already doing this work could be beneficial. This could include:

- Santa Clara County Green Business program
- EPA's Performance Track
- California Integrated Waste Management Boards' Waste Reduction Awards Program (WRAP)
- Sustainable Silicon Valley

Title: DEVELOP ENERGY CONSUMPTION STANDARDS FOR ALL BUILDINGS

Working Group: Built Environment

Statement of Issue

To create the most straightforward path to a more energy efficient existing building stock based on an energy performance standard that each building must meet, the first step is to establish these standards. Since energy usage data will be collected and disseminated through both the audit program (commercial) and the mandated energy usage data program (residential), the city should use this data in order to provide building owners and occupants a basis to evaluate their building's performance based on how other like buildings in the area are performing.

Recommendation

Establish standards for energy use based on building type and size so that the city can provide building owners and occupants with this information.

Create a database of energy usage data on all buildings in Mountain View based on the data collected through the audit program and energy usage data program. Once enough information has been collected (<1 year's worth), data can then be evaluated and averages for various building types can be established. These averages can then be communicated to building owners, occupants and operators based on building size and type (*i.e. A single family home of 1,750-2,000 sq. ft. averages xxx electricity usage and xxx natural gas usage during the month of June*). This would provide a basis for those responsible for building operation to see how their building is performing compared to other like buildings in the area.

Once these averages have been established, target standards can be set for various building types in order to give the city a basis to monitor building energy usage and establish more creative programs to incentivize efficiency upgrades. This system of measurement and feedback will then create demand for programs such as the revolving loan and carbon offset credits that we have also recommended.

Environmental Impact

The environmental impact of such a program could be significant and is based on the fact that if you give those responsible a measuring stick to evaluate their building's performance, they will inherently take notice and make efforts to reduce usage and make buildings more efficient. This phenomenon has been seen with energy monitoring devices placed in buildings that allow occupants to see their usage real time. In these cases buildings with monitoring devices performed at significantly more efficient levels simply because the operators had the data to evaluate. This is also seen with hybrid automobiles like the Toyota Prius which provide feedback on fuel efficiency and allow the driver to make adjustments based on their driving habits.

Fiscal Impact and Synergies

The cost of collecting of data and maintaining a database would be the only realized costs for such a program since the data would be available through PG&E based on historical energy usage as well as

feedback from the building energy audit program. Incorporating this program into the audit and usage feedback systems would be a relatively simple next step.

Obstacles

The most significant obstacle would be acquiring energy usage date from PG&E and disseminating it to the proper individuals. Resistance from groups like local Realtor and building operator Associations should be expected since such a system would require mandates for information disclosure.

Partnerships

Partnerships with PG&E will be critical in order to get access to data. Groups such as Acterra or Sustainable Silicon Valley could also be of great help in collecting usage data as well as establishing usage standard targets.

Appendix

Web Sites

www.acterra.org

http://www.sustainablesiliconvalley.org/

Title: PROVIDE RESIDENTIAL BUILDING ANNUAL ENERGY USAGE AT TIME OF TRANSFER.

Working Group: Built Environment

Statement of Issue: Existing homes and businesses are responsible for 31% of Mountain View's CO2e emissions.[9] Energy costs are high, and rising, yet little or no information on the historical energy use of a building or home is available to people making decisions about purchase, lease or rental. Energy use can vary substantially, depending on a building's installed appliances, lighting, heating, venting, air conditioning, and overall building shell performance. For example, even a small sample of similarly-sized homes in the region shows a substantial variance in annual energy costs. GreenNow, a Mountain View-based energy consulting firm, found that for homes of approximately 2,400 square feet, annual natural gas costs vary by $3,500, and annual electricity costs vary as much as $6,300.[10] Resident energy-using habits are part of the variance, but most of it can be tracked to the home's installed features and performance.

Having readily-available information on energy usage would aid purchase and lease and rent decisions. Such information would also help to put a value on properties with better energy efficiency, and provide an incentive for owners to make energy efficiency upgrades. This is particularly critical for low income residents, whose utility bills are a disproportionately large portion of monthly spending.

Recommendation: Require disclosure of the past year's energy usage and costs at point-of-transfer for all commercial and residential properties. Transfer would include sale, lease or rental. Data is already available from Pacific Gas and Electric as a one-page report of annual energy usage and cost history.

Bill Date	Electric Usage (kWh)	Electric Charges ($)	Gas Usage (Therms)	Gas Charges ($)	Total Charges ($)
6/24/2008	5,269	$1,667.76	82.0	$148.91	$1,816.67
5/22/2008	4,396	$1,340.00	92.0	$155.59	$1,495.59
4/23/2008	5,039	$1,398.09	157.0	$255.16	$1,653.25
3/25/2008	5,463	$1,499.44	234.0	$344.16	$1,843.60
2/22/2008	6,522	$1,772.45	306.0	$439.11	$2,211.56
1/23/2008	7,052	$1,953.50	303.0	$429.51	$2,383.01
12/26/2007	7,317	$2,096.59	249.0	$364.31	$2,460.90
11/26/2007	7,750	$2,286.53	224.0	$324.51	$2,611.04
10/25/2007	3,556	$1,107.07	94.0	$138.29	$1,245.36
9/25/2007	5,009	$1,614.78	74.0	$104.03	$1,718.81
8/27/2007	4,523	$1,448.25	75.0	$107.51	$1,555.76
7/27/2007	4,783	$1,539.98	94.0	$150.05	$1,690.03
6/26/2007	4,516	$1,435.94	74.0	$114.02	$1,549.96

Image: sample residential bill history from Pacific Gas & Electric

[9] From data in Baseline and Measurements working group report, June 27, 2008.
[10] GreenNow USA.

Alternatively, once data is collected on a number of homes and businesses, the City of Mountain View could develop an energy certificate with a scoring system similar to the Energy Star appliance or fuel mileage labels, which would provide annual electricity and gas usage and cost data, with comparison to similar properties.

Implementation details: Development of a new City ordinance. Information on the ordinance could be included in annual tax bills to land owners, along with tips about energy savings actions.

Timeline: short term.

Environmental Impact:

1) Energy certificates could provide an incentive for building performance and energy efficiency improvement in the commercial and residential sectors.
2) Emissions reductions could be significant. As illustrated in the tables below, with low-cost actions implemented on a moderate scale (efficient showerheads, CFLs, and occupancy sensors for lighting), annual CO2e savings could approach 800 metric tons. With medium to high implementation rates of these low-cost actions, plus some timers and day-lighting for large offices, annual CO2e savings would approach 4,400 metric tons.

Moderate action scenarios

Annual CO2 savings (metric to	Annual tenant savings	Scenario
120	*$71,133*	*25% of businesses install occupancy sensors for lights*
21	*$15,750*	*10% of homes for sale make improvements saving 20% CO2e*
519	*$162,468*	*10% of rental homes upgrade to moderately efficient showerheads (2.2 gpm from existing mix of 5.5 and*
135	*$170,288*	*20% of rental homes replace three incandescent bulbs with CFLs*
794	*$419,638*	

Medium to high action sc

Annual CO2 saved (r tons)	Annual savings	Scenario
1221	*$710,030*	*50% of businesses install lighting savings devices, including a mix of occupancy sensors, timers and day*
63	*$47,250*	*30% of homes for sale make improvements saving 20% CO2e*
2766	*$866,473*	*60% of rental homes upgrade to moderately efficient showerheads (2.2 gpm from existing mix of 5.5 and*
336	*$425,719*	*50% of rental homes replace three incandescent bulbs with CFLs*
4386	$2,049,473	

Tables: calculations based on figures from DOE, Mountain View census, and GreenNow USA methodologies

Fiscal Impact and Synergies: Savings to Mountain View residents and businesses could be substantial. As illustrated in the tables above, even with low-cost measures like efficient showerheads, CFLs and occupancy sensors, savings on annual energy bills could be as high as $2,049,473.[11]

Funding for implementation of energy-saving measures for low-income and rental housing could come from a city-managed revolving loan program and/or a local carbon offset program (see Recommendation #6).

[11] Savings based on current energy prices. With energy costs rising annually, savings are likely to be substantially greater. For instance, energy analysts predict that winter natural gas bills will rise up to 50% in the next year (Wall Street Journal, Rebecca Smith, "Winter Could Test Energy Math," Jul 18, 2008).

Obstacles & Partnerships:

- One potential obstacle is the availability of energy usage data for rentals where the owner does not hold the Pacific Gas & Electric account. It is possible that an alternative reporting system would be necessary for rental properties where tenants are responsible for part or all of the utility billing. A partnership with Pacific Gas & Electric could also potentially solve this problem.

Recommendation #7

Title: INCREASE PLANNING AND BUILDING DEPARTMENT'S GREEN FRIENDLINESS

Working Group: Built Environment

Statement of Issue

The most significant impact on implementing green building practices can be made by those responsible for the permitting and oversight of construction projects in Mountain View, namely the planning and building departments. The Management and Staff of these departments should be knowledgeable in all aspects of green building methodologies and practices and should be able to provide input and recommendations that will enhance green projects. The current state of the planning and building process tends to be very restrictive when it comes to green systems and construction practices.

These departments should be seen as a tool to help homeowners as well as design and construction professionals to integrate green elements into their projects, rather than an impediment to making them happen.

Recommendation

1. Have planning and building department personnel trained on green building practices through Build it Green's Certified Green Building Professional (CGBP) program. This is a 2 day program that covers green building practices from design through finish construction and provides a great basis of understanding for green design and construction methodologies. The goal of this education is to create a consultative nature to these departments so that they can actually encourage and influence green decisions at the formative decision stage of planning. By working collaboratively with the public as well as building professionals, these practices can be implemented much more effectively on a project by project basis than by mandates or requirements.

2. Review the city design guideline documents that are distributed in order to give industry professionals guidance on how to design a building in Mountain View. These documents contain no information on green design ideas, green systems, green materials or anything that would allow a designer/architect to integrate green aspects into their project. Again, by encouraging these practices proactively rather than reactively the city will be able to realize a much greater rate of compliance with green building standards. As an alternative to adding green content to the existing planning documents, use already available pieces from Build it Green or the USGBC who both have extensive libraries of material available for use at no charge.

3. Establish a volunteer sustainable building advisory group made up of local green building professionals to help advise city staff on green building practices and help create green design and building guidelines.

Timeline: Short Term (less than 1 yr.)

Environmental Impact

Higher performing green buildings are cost effective, even for projects loaded with high-value features, higher first costs are often recovered within three to five years through lower operating expenses and utility rebates for energy-saving equipment. Savings in energy costs of 20-50 percent[i] are common through integrated planning, site orientation, energy-saving technologies, on-site renewable energy systems, light-reflective materials, natural daylight and ventilation, and downsized equipment.

Currently, many of these green building elements do not come with a cost premium, especially when it comes to smart design planning, which is where planning department education can be invaluable in assisting applicants in adopting these practices.

20-50% energy reduction means a reduction of 61,388 – 153,469 metric tons CO2e for Mountain View.

Fiscal Impact and Synergies

Cost for CGBP training is $400 per participant, however staff training could certainly be arranged on a group basis through Build it Green. Consultants could also be sought out to conduct such training tailored specifically for department staff. Marc Richmond of Practica consulting in Berkeley teaches the Build it Green sessions and could be engaged for such purposes (see exhibit A for Resume).

Obstacles

The only true obstacle is the resistance of city staff to embrace green training and principles

Partnerships

Build It Green's Public Agency Council
The Build It Green Public Agency Council (PAC) is a unique collaborative effort of over 100 participating public agencies that meet quarterly to share information, create consistent green building standards in their regions, and support each others programs and initiatives.
Benefits of participation

- Participate in an exchange of ideas and resources about municipal green building programs
- Develop mutually beneficial programs in a forum that connects with the building industry
- Network with other public agencies and community leaders
- Hear about the latest green building products & technologies
- Collaborate on state initiatives and programs to facilitate the adoption of green building in California

Requirements for becoming an Affiliate Member
Participation in the PAC is available only to those professionally affiliated with a California public agency or utility. Build It Green Company Membership is encouraged but not required. Membership is only $100/year and gives your agency a vote in our annual board of directors election and discounts on training. It is a great value.

Each PAC chapter meets quarterly, and Affiliates and guests are welcome to attend meetings in any region regardless of their place of work. View the upcoming meetings by clicking on the links above. Meeting agendas, minutes, and other information are available only to affiliates in the login-protected PAC area.

Join us at our PAC Meetings

To apply to become a Public Agency Council Affiliate or attend as a guest, please contact Government Relations Manager Valentin Alexeeff at Val@BuildItGreen.org or by phone at 510-845-0472 ext. 115. Or go to http://www.builditgreen.org/councils/pac.

Appendix

Web Sites

http://www.builditgreen.org/factsheets?page=1
www.usgbc.org
http://www.practicaconsulting.com/index.html

MARC RICHMOND

515 Academy Drive, Austin, TX 78704
(512) 447-5023, marc@practicaconsulting.com

EDUCATION

CLAREMONT GRADUATE SCHOOL, Claremont, California
M.A.P.P. (Energy and Environmental Policy), *Center for Politics and Economics*, May, 1993
M.B.A. (International Business/Public Policy), *Peter F. Drucker Graduate Management Center*, May, 1993
Thesis analyzed the marketing of residential energy efficiency / President of International Business Association

MORAVIAN COLLEGE, Bethlehem, Pennsylvania
B.A., (Economics); May, 1986

SWARTHMORE COLLEGE, Swarthmore, Pennsylvania
Undergraduate course work towards B.A., (Economics), 1981-1983

EXPERIENCE

Practica Consulting, Austin, TX and Berkeley, CA
President (2005-present)
Consult with building professionals, policy-makers, non-profits, and the public on green building products and practices.

What's Working, Boulder, CO and Berkeley, CA
Project Manager (October 2003-2005)
Consult with building professionals, policy-makers, and the public on green building products and practices. Conduct FSC chain-of-custody audits.

City of Austin Green Building Program, Austin, TX
Manager (December 1997-August 1999), Project Manager (April-December 1997 and September 1999-present)
Managed an internationally recognized education and marketing program, which promotes concepts of sustainable design and construction. Educated architects, builders, engineers, suppliers, manufacturers and the public on resource-efficient building designs, materials and construction practices. Managed a staff of 11 professionals and $1.3 million budget.

Texas State University, Interior Design Department, San Marcos, TX
Adjunct Professor (Course: Environmental Housing, Spring 2002)
Taught the introductory to Residential Housing course for interior design students covering the basics of housing types, interior design, structural elements, materials, mechanical systems, energy conservation and green building.

Bowerbird Construction, Austin, TX,
Supervisor (April 1996-March 1997)
Supervised and constructed all stages of two sustainable residences, managing 12 staff, client contact, billing, and materials.

Zeitgeist Environmental, Altadena, CA
Principal (July 1994-April 1996)
Consulted to architects on green building products and designs. Reviewed plans and specifications. Participated as a sustainable design charette team leader and principal member of Post-charette Publication Committee. Wrote winning RFP and consulted to manage a contract with the City of Los Angeles to increase economic growth, industrial recycling, and minority employment. Remodeled historic homes (framing, cabinetry, masonry, flooring, electrical, painting, etc.).

Eos Institute, Laguna Beach, CA
Project Co-Director (January 1995 - February 1996)
Developed grant proposals and received funding from the Turner Foundation for a national project to educate building professionals and the public on alternative wall systems. Researched wall systems to document costs, advantages/disadvantages, field experience, qualified manufacturers/installers, and appropriate applications. Represented the Eos Institute at trade shows, conferences and workshops to research and promote systems.

MARC RICHMOND

EXPERIENCE (continued)

UCLA Extension, (course: The Ecology of Architecture), Westwood, CA
Lecturer (Fall 1994, Spring 1995)
Co-taught two six-week courses on sustainable design including environmental realities, siting and construction, structural and envelope systems, mechanical systems, and finally interior design and material choices. Developed all lecture discussions and handout materials, and graded all papers for class sizes of roughly 35 adult students.

Syndesis Inc., Santa Monica, CA
Environmental Building Consultant & Project Manager (July 1994-May 1995)
Directed all environmental construction aspects an "environmental showcase home" including specifying materials and adjusting designs for architectural division of the firm. Prepared reports, acquired material donations from manufacturers in trade for project publicity, and created promotional materials (project published in numerous trade journals). As project manager, was responsible for initiating a customer service, installation and repair department for the architectural precast concrete materials division of the firm. Managed sales, customer service, contracts, installations, and a crew of six.

Financial Energy Management Inc., Denver, CO
Project Manager (August 1993-May 1994)
Managed installations of retrofit energy efficiency equipment on a large hospital and smaller commercial buildings. Equipment changes included efficient lighting and solar window film. Managed a crew of eight and all client contact. Managed a local utility electric-to-gas heating unit conversion rebate program by selling program to homeowners, distributed rebate moneys, metered equipment pre and post-retrofit, and maintained contact with utility representatives. Other responsibilities included preparing requests for proposals (RFPs) to utilities nationwide.

Applied Design Inc., Bethlehem, PA,
Architectural Woodworker, Residential Remodeler (April 1988-May 1990)
Apprentice woodworker in small shop designing and building woodworking details for historic buildings. Remodeled small commercial and residential buildings (framing, drywall, tile/marble, painting and electrical).

Frey Electric, Bethlehem, PA,
Apprentice Electrician (December 1987-June 1990)
Apprenticed with journeyman electrician on residential remodeling projects.

Hanoverville Roadhouse, Bethlehem, PA
Restaurant Manager , Commercial Remodeler (May 1987-November 1988)
Managed a 125 seat fine dining establishment. Worked on full gut/remodel of restaurant.

NYNEX Business Centers, Allentown, PA
Administrator (August 1986-May 1987)
Managed inventory, ordering, and shipping for business-to-business personal computer sales office.
Marketing Representative, (July 1986 - December 1986)
Marketed personal computers and typewriters to small businesses.

SKILLS

Managing projects, staff, operations, research and sales/marketing
Technical expertise in energy efficient and sustainable construction and marketing
Communicate well orally and in writing.
Fluent in German, and conversational in Spanish.
Certified dance instructor. Hobbies include tango/salsa/swing dancing, collecting art and 1950s period elements.

ORGANIZATIONS

Build It Green, Advisory Board Member
West Coast Green Conference, Board Member
Unites States Green Building Council, LEED-Residential Steering Committee, former Chair
California Energy Commission, Wall Systems Collaborative, former Co-Chair Education Committee

MARC RICHMOND

PRESENTATIONS

Conferences

1998 Biocycle National Conference, Dallas, TX
Texas Recycling Summit 1998, Austin, TX
US Green Building Council Government Summit, San Diego, CA
International Green Building Conference, Austin, TX

1999 4th Annual Joint Services Pollution Prevention & Hazardous Waste Management Conf., San Antonio, TX
Texas Natural Resource Conservation Commission Environmental Trade Fair, Austin, TX
Carolina Recycling Association Conference, Myrtle Beach, SC
American Institute of Architects National Convention, Dallas TX

2000 Building Green Symposium, Harvard Graduate School of Design, Cambridge, MA
US Green Building Council Membership Summit, Gleneden Beach, OR
Carolina Solar 2000 Update, Raleigh, NC (keynote)
Polyisocyanurate Manufacturers Association Membership Conference, Galveston, TX
Sustainable San Antonio Conference, San Antonio, TX
US Green Building Council LEED Conference, Racine, WI (2 times)

2001 GreenPrints 2001, Atlanta, GA
American Solar Energy Society Forum 2001, Washington DC
US Green Building Council LEED Conference, Racine, WI
US Green Building Council Membership Summit, Tucson, AZ
Affordable Comfort Conference, Milwaukee, WI
Texas Renewable Energy Roundup, Fredericksburg, TX
Mayor's Roundtable on Green Building, Asheville, NC (keynote)

2001 American Society of Interior Designers Super Campus, New Orleans, LA
Texas Renewable Energy Roundup, Fredericksburg, TX

2002 International Green Building Conference and Expo, Austin, TX
Texas Renewable Energy Roundup, Fredericksburg, TX

2003 American Council for an Energy Efficient Economy's National Symposium on Market Transformation
International Green Building Conference and Expo, Pittsburgh, PA

2004 Green Building Expo, Park City, Utah

2005 EcoBuild America, Orlando, FL
World Environment Day, San Francisco, CA
Green Materials Showcase, San Francisco, CA
Green Building Expo, Park City, Utah

2006 Structural Insulated Panel Association Annual Conference, Austin, TX
West Coast Green Conference, San Francisco, CA
Solar Power 2006 Conference, San Jose, CA

Colleges and Universities

University of California - Los Angeles, Sonoma State University, University of Texas - Austin, University of North Texas, Texas A&M University, Southwest Texas State University, New College of California, University of Redlands, Austin Community College

Major Seminars

National Association of the Remodeling Industry, Sustainable Buildings Industry Council, American Society of Interior Designers, Austin Green Building Program, Sustainable Building Coalition, State of Texas Energy Office, Center for Maximum Potential Building Systems, AmeriCorps Green Building Training Seminars, Iowa Center on Sustainable Communities, Recycle Utah, Green Homes Northeast, Build It Green: Green Remodelers Guild

PUBLICATIONS

Books

Healthy Construction Guidelines (co-editor with Christi Graham)

Videos

US Environmental Protection Agency, Green Building Case Studies (interviewee)
US Environmental Protection Agency, Austin Green Building Program (narrator/presenter)

DVD/CD-ROM

Green By Design (project manager)
Green Building: Your Edge in the HomeBuilding Marketplace (co-presenter/trainer with David Johnston)

Title: GREEN BUILDING INCENTIVE PROGRAM

Working Group: Built Environment

Statement of Issue

Mandated practices in the form of checklists and verification processes are great for educating project participants and guiding them through the green design and construction process, however in order to raise the bar and encourage projects to really push the limit with respect to energy efficiency and resource consumption, there needs to be positive incentives to go above and beyond the standard. Incentives will provide a basis for participants to look beyond what is established as baseline practices and explore ways to make buildings even more efficient than previously imagined.

Recommendation

Establish a reward system that will incentivize projects to push for the highest efficiency and resource conservation thus reducing the carbon footprint created by these projects. Incentives should be explored that are not hard costs to the city, but provide value to the project owner and participants. This incentive program could be tied to Title 24 data (i.e. incentives for exceeding Title 24 by more than 20%).

Ideas for such incentives include:

- **Application fast tracking** – provide expedited process time for both planning and building department applications. This is a great way to transfer value from non-green projects to green projects. In construction, time is literally money, so a couple of weeks of expedited time saving in review can have a huge dollar value to the project and cost nothing to the city or department.
- **Allowances –** Offer extra allowances for green projects that meet a certain threshold. These allowances can be in the form of floor area ratios (FAR), setbacks, height requirement concessions, etc.
- **Reduced Application Fees –** Reduced fees could be a great incentive to push a project towards greater efficiency. In order to keep the overall balance of revenues from application fees unaffected, non-green projects would be charged more in order to balance out the reduction in costs for green project.

Mountain View should certainly try to meet or exceed any neighboring city's incentive program so as to try and attract green developers and truly efficient building projects. Look to other neighboring cities like Palo Alto, Menlo Park, Los Altos, etc. who are just establishing these incentives and will be implementing them in the near future.

Timeline: Short Term (less than 1 yr.)

Environmental Impact

The measurable environmental impact is hard to quantify, however these incentives would certainly facilitate a process of continually pushing for greater and greater building efficiency through innovative design, new technology and advanced building practices. Perhaps the greatest impact overall of an incentive system would be the resulting model green projects in the city of Mountain View and the ability of the city to use these model projects as educational tools to continually seek to improve building performance by encouraging like practices on future projects. The snowball effect of such a process can have a significant effect on the reduction of the carbon footprint created by the built environment.

Fiscal Impact and Synergies

If incentives are created strategically by using no cost programs as well as redistributing some of the fee revenue generation towards non green projects, they can have a zero sum cost to the city.

Obvious synergies exist here between mandated green building standards, green education through the planning & building departments, and green building incentives. Education will support the green building standard system which will then give much more importance to the incentive system.

Obstacles

Any incentive system has the potential to incent undesirable actions, so the system would have to be reviewed and any cracks sealed up so that only the most desirable green practices are incented.

Recommendation #9

Title: ALL CONSTRUCTION PROJECTS, NEW & RENOVATION, TO DIVERT 75% OF CONSTRUCTION & DEMOLITION WASTE FROM LANDFILLS.

Working Group: Enter the name here.

Statement of Issue

Landfills all over the country are filling to capacity faster than new sites can be identified. The State of California passed a law several years ago to force communities to reduce their landfill space by 50% Most communities then turned to recycling to alleviate this problem. Curb side recycling has helped substantially, but construction waste remains as a substantial landfill problem.

- The EPA estimates that 136 million tons of building-related construction and demolition (C&D) debris was generated in the U.S. in a single year. Source: http://www.epa.gov/epaoswer/non-hw/debris/about.htm, and U.S. EPA Characterization of Construction and Demolition Debris in the United States, 1997 Update.

- Compare that to 209.7 million tons of municipal solid waste generated in the same year. Source: U.S. EPA Characterization of Municipal Solid Waste in the United States, 1997 Update. Report No. EPA530-R-98-007

These estimates total 345.7 million tons of solid waste with 39% construction waste and 61% municipal solid waste. Materials that end up in the landfill are for the most part new material that can easily be recycled into new products or reused on another project. Much of this material is not biodegradable and will remain exactly as it was left, many years from now, all the while leaching poisons into the soil. Many of the products we use each day are actually considered hazardous waste when disposed of, even when brand new. Much of it ends up in our landfills anyway due to a lack of understanding about the products and their manufacturing process.

The City Council recently passed an ordinance requiring 50% of all construction waste to be diverted. The base level of LEED requires 50% of construction waste to be diverted for other uses such as recycling. Many LEED projects have achieved the second level of diversion which is 75%. If projects designed ahead of time to achieve 75% it can be achieved without much more effort than 50%. The design specification, waste diversion plan and waste management system on the job site are virtually the same for 50% and 75%, but 75% gives the project and the City a much bigger environmental bang for their buck.

In order to earn these credits, however, the recycling system in Mountain View will need to be slightly modified. Currently, if a contractor hires Foothill Disposal to haul their construction waste it will be treated at mixed C and D or construction and demolition waste. The mixed construction waste will be taken to the SMART station where it will be sorted and diverted or sent to the landfill. LEED requires contractors to submit the weighed receipts for the waste. If it's mixed C & D waste they must submit the weight receipts and the certified yearly diversion totals for that waste facility to determine what percentage of the total construction waste was diverted. Currently SMART does not track the amounts required to certify their yearly totals. You cannot earn LEED credits if you use the SMART station currently. You can separate all the construction waste on site and contract with

haulers to go to separate facilities to get the receipts needed to earn the credits, but many contractors contract with Foothill since they have the overall Mountain View solid waste contract, making a mistake that cannot be fixed after the fact. Once the waste is sent to SMART, even one bin, the project cannot earn the credits based on anything that was diverted from those bins. They have to be treated as non-diverted solid waste. Even if everything put in the bins was recyclable.

Recommendation

All construction projects, new & renovation, to divert 75% of construction & demolition waste from landfills. This recommendation can be implemented immediately.

Environmental Impact

If on average construction waste totals approximately 39% of the solid waste in landfills then we can approximate the total GHG from construction waste in Mountain View landfills to be 45,934 metric tons CO2e of the total GHG of 117,780 metric tons CO2e noted in the ICLEI study on Mountain View CO2e emissions.

By removing 75% of the construction waste then the best-case estimate would be a reduction of 34,451 metric tons CO2e.

Fiscal Impact and Synergies

The fiscal impact is typically substantial cost savings to the project and contractor due to very expensive tipping fees for construction waste. There is also substantial savings to the City or community that would normally go to pay for additional landfill space.

Obstacles

As with any new program or methodology there is always a learning curve in doing something new. Once the design and construction teams do this once they will have no problem repeating this behavior time and again. And once the contractor sees the cost savings there will be no obstacle.

Partnerships

Most communities and the State of California provide a myriad of informational aids. www.Stopwaste.org is a great website with everything needed to learn how and where to recycle construction waste. The California Integrated Waste Management Board has many resources to learn about recycling. **http://www.ciwmb.ca.gov/**

Appendix

Citations (not referenced in footnotes)

Web Sites (not referenced in footnotes)

Contact Information

[i] USGBC Building Momentum – National trends and prospects for high performance green buildings

Construction & Demolition Waste Diversion

Construction and Demolition Waste (C&D Waste) Diversion is an essential practice of an efficient, responsible business. Maintaining a well-managed jobsite also has its rewards: builders save money through lower materials costs and fewer tipping fees (the charge for landfills to dispose of solid waste;) a cleaner site is safer to walk through, providing fewer opportunities for falls, injuries, or fire; and a cleaner site makes it easier and faster for workers to find smaller pieces of materials, reducing the waste of cutting large pieces into small ones. Finally, practicing waste diversion impresses clients that you care about their job and brings a higher sense of quality to the site and workers, which transfers to all other aspects of job performance. Although many contractors are not experienced with incorporating waste reduction strategies into their practices, once they've seen the benefits they invariably question why they waited so long to start!

DESIGN COMPARISONS

C&D Waste Diversion Practices	Conventional Waste Practices
Materials used efficiently	Materials are wasted
Valuable material is recycled	"Locks up" valuable material
Useful material is reused	Requires purchase of new material
Tipping fees are lower	Tipping fees are higher
Preserves landfills longer	Fills up landfills quickly

LEED CREDITS

Using this material potentially contributes to obtaining these credits in the US Green Building Council's LEED certification program:

Materials & Resources

MR Credit 2.1 Construction Waste Diversion (50% diversion)

MR Credit 2.2 Construction Waste Diversion (75% diversion)

LEED stands for Leadership in Energy and Environmental Design. To find out more about it, visit www.leedbuilding.org

DESIGN CONCEPTS

Effective recycling of materials generally requires that the waste materials be as clean and uncontaminated as possible. Consequently, waste such as painted gypsum board and painted wood cannot be recycled, though painted wood may be appropriate for some reuse applications. Unpainted wood and drywall can be used for compost, and useful wood is salvaged at the Berkeley Transfer Station (nails do not have to be removed) as well as other locations in Contra

Costa County. Concrete, metal, and asphalt are routinely recycled, and the recycling fee is a small fraction of the cost of disposal at a landfill or transfer station. Some firms will pick up materials directly from the construction site. Check with the local jurisdiction that you are working in for regulations regarding who can lawfully haul solid waste, mixed C & D recyclables, and/or separated recyclable materials. The building department may even have a list!

Because demolition waste is more likely to be composed of assemblies that cannot be practically separated, the rate of waste diversion will typically be lower than with construction waste. However, since demolition produces a much greater volume of waste than new construction, diverting as much demolition waste as possible is very important. Consider subcontracting the demolition work to a company that specializes in deconstruction and salvage. A growing number of non-profit deconstruction contractors can salvage 75% or more of waste and demolition materials. These subcontractors can appraise the value of the materials and arrange for the donation of materials to various community nonprofits. Because the materials are donated, the client can obtain a tax deduction, more than offsetting the additional cost of using the more labor-intensive deconstruction costs. These nonprofits also provide considerable community benefit, providing job training and employment for otherwise homeless and low-income workers.

Many for-profit firms are also available. They dismantle and remove reusable materials before traditional site clearing and then prepare them for re-sale. Hiring a salvage or deconstruction contractor can save significant money and resources. For a list of contractors, download the Builders' Guide (below), or see www.builditgreen.org/guide and search within the category *Job Site*.

The **Demolition Waste Diversion Strategy** is based on 2 R's: reuse and recycle.

1. Inventory everything that will be demolished and identify materials and products that can be salvaged. Some of the salvaged items may be appropriate to reuse for the same project.
2. Identify businesses or other facilities that will accept these materials and products. The Bay Area has an abundance of businesses that buy and sell salvaged materials, so finding a market is often quite simple. See the Resources section at the bottom of this factsheet for a listing of solid waste management authorities and links to salvage venues.
3. Carefully remove salvageable materials. Depending on the type, condition, and quantity of the materials, salvage businesses may pick up them up from the jobsite and/or pay for them.
4. Arrange to have jobsite bins for both recyclable and non-recyclable materials. If the jobsite is tight on space, find out what construction waste facilities can accept mixed C&D recyclables in order to considerably reduce the number of bins. Obtain a list from the building department, hauler or C&D waste recycling facility of what can and can't be recycled. Make sure the bins are clearly labeled.
5. Make sure all workers know what can and can't be recycled and that they understand why separating the materials is a priority. Let the demolition begin!

The **Construction Waste Diversion Strategy** is based on 3 R's: reduce, reuse, and recycle.

1. Reduce labor and material waste by designing the building to use materials efficiently. Because lumber and sheet material is typically milled in two foot increments, laying out a building on a two foot module can significantly reduce the time and waste of off-cuts. This approach is known as Advanced Framing or Optimum Value Engineering (OVE). The National Association of Home Builders Research Center (NAHBRC) is an excellent resource

that will tell you more about practices for reducing labor costs, material costs, and construction waste: www.nahbrc.org. Enter "OVE" in the search box and read the abstract on Advanced Framing Techniques: Optimum Value Engineering (OVE).

2. Donate any unused materials to nonprofit organizations such as Habitat for Humanity. In addition to reducing waste and supporting a good cause, the material donation may be tax deductible. Clean gypsum board, trim, and surplus products like windows, doors, and fixtures would be welcomed. List your unwanted materials on your local CalMAX Local Material Exchange portal at http://www.ciwmb.ca.gov/calmax/MiniMAXs.htm.
3. Check with the local jurisdiction in which you are working for regulations regarding who can lawfully haul solid waste, mixed C & D recyclables, or separated recyclable materials. Arrange to have jobsite bins for both recyclable and non-recyclable materials. Many construction waste facilities now accept mixed recyclables, so the number of bins on tight jobsites can be reduced considerably. Make sure the bins are clearly labeled. Obtain a list from the hauler or C&D waste recycling facility of what can and can't be recycled. See the Resources section for a list of building material recycling facilities.
4. Make sure all workers know what can and can't be recycled and that they understand why separating the materials is a priority. Let the construction begin!

ENVIRONMENTAL ATTRIBUTES

Resource Impacts

In the Bay Area, C&D waste accounts for approximately 20% of the total waste stream going to landfills. In addition to the loss of opportunity in reusing salvaged materials, the environmental cost of mining, fabricating, and transporting millions of tons of usable resources for construction and then sending them to landfills after not using them is considerable. If salvaged instead, these materials would reduce the amount of virgin resources extracted and the associated environmental impacts. Furthermore, as landfills fill up, waste needs to be transported to landfills that are further away, increasing transportation and environmental costs.

It's the law! Check with the local jurisdiction that you are considering working in, as many cities in the Bay area require at least 50% recycling of C&D waste, and some require 100% diversion of concrete and asphalt.

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FUNCTIONAL CONSIDERATIONS

Cost

A number of case studies analyze savings from reducing C&D waste, and they demonstrate a net cost savings of $0.10 to more than $1.00 per square foot. Labor rates, local tipping fee rates, and the ever-changing cost of building materials are factors that will affect the equation. But, particularly in locations with tipping fees exceeding $40 per ton, the cost savings will be significant.

Employing Advanced Framing techniques can result in even larger savings, since both material costs and waste costs are reduced. Case studies conducted by the NAHBRC in the 1990s found

cost savings ranging from $0.24 to $1.20 per square foot. In a 2000 square foot house, this amounts to approximately $500 to $2500 of net savings, which goes directly to profit.

RESOURCES

Bay Area Solid Waste Management/ Recycling

Alameda County Waste Management Authority - ACWMA (510) 614-1699 www.stopwaste.org **Builders' Guide to Reuse and Recycling** https://www.stopwaste.org/docs/buildersguide-05.pdf **Central Contra Costa Solid Waste Management Authority - CCCSWMA** (925) 906-1801 www.wastediversion.org **Contra Costa Builders' Guide to Reuse and Recycling** www.wastediversion.org/pdffiles/CDGuide0303.pdf **City of San Jose Environmental Services** (408) 277-2700 www.sjrecycles.org **Marin Hazardous and Solid Waste Joint Powers Authority - JPA** www.marinrecycles.org	**San Francisco Department of the Environment** (415) 355-3700 www.sfenvironment.com **Sonoma County Waste Management Agency - SCWMA** www.recyclenow.org **West Contra Costa Integrated Waste Management Authority - WCCIWMA** (510) 215-3125 www.recyclemore.com **California Integrated Waste Management Board - CIWMB** (916) 341-6000 www.ciwmb.ca.gov

Building Material Salvage Businesses

www.builditgreen.org/guide

Dismantling/ Deconstruction/ Site Cleanup Contractors

www.builditgreen.org/guide

Building Material Recycling Facilities

www.stopwaste.org/home/index.asp?page=36

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